

APPENDIX I.3

PRELIMINARY NOISE ABATEMENT ANALYSIS

Feasibility

Under the Caltrans' *Traffic Noise Analysis Protocol* (October 1998), noise abatement measures must be considered when traffic noise impacts have been identified. Preliminary noise abatement design includes acoustical considerations such as noise barrier heights, lengths, and location. A minimum of a five-dBA reduction in noise levels must be achieved at the impacted receivers for the proposed noise abatement measure to be considered feasible. The feasibility analysis for the SR-22/West Orange County Connection project is presented in the *Traffic Noise Impact Technical Report* and *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum*, Parsons Brinckerhoff, December 2000. Different noise barrier heights are considered when assessing feasibility. Greater noise reductions are encouraged if they can be reasonably achieved. Feasibility may also be affected by physical constraints, such as topography, driveways, ramps, cross streets, other noise sources in the area, and safety considerations.

Reasonability

Whether a noise barrier wall is *reasonable* is a more complicated determination that includes the following considerations:

1. Cost of the abatement
2. Absolute noise levels
3. Change in noise levels
4. Noise abatement benefits
5. Date of development along the highway
6. Life cycle of abatement measures
7. Environmental impacts of abatement construction
8. Social, economic, environmental, legal, and technological factors
9. Opinions of impacted residents
10. Input from the public and local agencies

The first five of these considerations were analyzed for the SR-22/West Orange County Connection and results are included herein.

Reasonable cost allowances were evaluated for those barriers, at various heights, that were determined to be feasible. For any of the noise barriers to be considered reasonable from a cost perspective, the *total estimated cost* of the barrier must be at or below the *total allowance* calculated for each noise barrier. The *total allowance* for each noise barrier was established by considering the total number of residences benefited multiplied by the allowance per residence, a factor that varies depending upon local conditions. A critical noise receptor was selected for each noise barrier, which is the receiver that would have the highest predicted future traffic noise levels and represents the highest increase between existing and future build noise levels. The cost allowance calculations are included in the *Traffic Noise Impact Technical Report* and *Traffic Noise Impact Technical Report Reduced Build Alternative Addendum*, Parsons Brinckerhoff, December 2000. The *total estimated cost* of a noise barrier was based on an engineer's estimate that included all items appropriate or necessary for the construction of the barrier, such as traffic control, drainage modification, retaining walls, etc. A summary of the results of the reasonable analysis, including the number of residences benefited from each noise barrier, is presented in Tables A and B (for the Full Build and Reduced Build Alternatives, respectively).

The life cycle of noise abatement (factor 6), is considered when planned future use would limit the useful life of the abatement measure to less than 15 years.

Considerations 7 and 8 are analyzed throughout the SR-22/West Orange County Connection Draft Environmental Impact Report/Environmental Impact Statement (DEIR/EIS) (December 2000), with the impacts, if any, specifically described (particularly in Sections 4.10, Parks and Recreation, and 4.13, Visual Resources). Based on this feasibility and reasonability analysis, the *Preliminary Noise Abatement Decision* has been made, which is presented in Figures 4.9-1 and 4.9-2 and Tables 4.9-7 and 4.9-10 of the DEIR/EIS. During the public review period for the DEIR/EIS, impacted residents, the general public, and local agencies will have the opportunity to comment on the *Preliminary Noise Abatement Decision*. These opinions, which represent the last two considerations for reasonability, will be weighed in order to make the *Final Noise Abatement Decision*, which will be presented in the Final EIR/EIS.

Table A SUMMARY OF NOISE BARRIER REASONABLENESS FULL BUILD ALTERNATIVE <i>(for feasible noise barriers only)</i>						
Proposed Noise Barrier	Height in meters (m) (feet)	Number of Benefited Residences	Reasonable Allowance per Benefited Residences	Total Reasonable Allowance per Noise Barrier	Engineer's Noise Barrier Cost Estimate	Reasonable
NB-1	4.9 m (16 feet)	30	\$27,000	\$810,000	\$551,100	Yes
NB-2	4.3 m (14 feet)	22	\$37,000	\$814,000	\$482,800	Yes
	4.9 m (16 feet)	42	\$39,000	\$1,638,000	\$567,800	Yes
NB-3	4.9 m (16 feet)	65	\$33,000	\$2,145,000	\$567,800	Yes
NB-4	3.0 m (10 feet)	105	\$33,000	\$3,465,000	\$574,275	Yes
	3.7 m (12 feet)	146	\$33,000	\$4,818,000	\$710,125	Yes
	4.3 m (14 feet)	146	\$33,000	\$4,818,000	\$876,850	Yes
	4.9 m (16 feet)	146	\$35,000	\$5,110,000	\$1,031,225	Yes
NB-5	4.3 m (14 feet)	88	\$31,000	\$2,728,000	\$603,500	Yes
	4.9 m (16 feet)	88	\$31,000	\$2,728,000	\$709,750	Yes
NB-6	4.3 m (14 feet)	51	\$31,000	\$1,581,000	\$518,300	Yes
	4.9 m (16 feet)	51	\$31,000	\$1,581,000	\$609,550	Yes
NB-7	4.9 m (16 feet)	123	\$35,000	\$4,305,000	\$709,750	Yes
NB-8	3.0 m (10 feet)	73	\$29,000	\$2,117,000	\$502,200	Yes
	3.7 m (12 feet)	73	\$31,000	\$2,263,000	\$621,000	Yes
	4.3 m (14 feet)	73	\$31,000	\$2,263,000	\$766,800	Yes
	4.9 m (16 feet)	73	\$31,000	\$2,263,000	\$901,800	Yes
NB-9	4.9 m (16 feet)	127	\$33,000	\$4,191,000	\$1,319,300	Yes
NB-10	3.0 m (10 feet)	38	\$33,000	\$1,254,000	\$441,750	Yes
	3.7 m (12 feet)	38	\$33,000	\$1,254,000	\$546,250	Yes
	4.3 m (14 feet)	38	\$33,000	\$1,254,000	\$674,500	Yes
	4.9 m (16 feet)	38	\$35,000	\$1,330,000	\$793,250	Yes
NB-11	4.9 m (16 feet)	62	\$37,000	\$2,294,000	\$1,369,400	Yes
NB-12	3.7 m (12 feet)	89	\$33,000	\$2,937,000	\$908,500	Yes
NB-12	4.3 m (14 feet)	89	\$33,000	\$2,937,000	\$1,121,800	Yes
	4.9 m (16 feet)	89	\$33,000	\$2,937,000	\$1,319,300	Yes
NB-13	3.0 m (10 feet)	40	\$31,000	\$1,240,000	\$302,250	Yes
	3.7 m (12 feet)	40	\$33,000	\$1,320,000	\$373,750	Yes
	4.3 m (14 feet)	40	\$33,000	\$1,320,000	\$461,500	Yes
	4.9 m (16 feet)	40	\$33,000	\$1,320,000	\$542,750	Yes

Table A
SUMMARY OF NOISE BARRIER REASONABLENESS
FULL BUILD ALTERNATIVE
(for feasible noise barriers only)

Proposed Noise Barrier	Height in meters (m) (feet)	Number of Benefited Residences	Reasonable Allowance per Benefited Residences	Total Reasonable Allowance per Noise Barrier	Engineer's Noise Barrier Cost Estimate	Reasonable
NB-14	3.0 m (10 feet)	19	\$31,000	\$589,000	\$158,100	Yes
	3.7 m (12 feet)	19	\$31,000	\$589,000	\$195,500	Yes
	4.3 m (14 feet)	19	\$31,000	\$589,000	\$241,400	Yes
	4.9 m (16 feet)	19	\$31,000	\$589,000	\$283,900	Yes
NB-15	3.7 m (12 feet)	10	\$33,000	\$330,000	\$195,500	Yes
	4.3 m (14 feet)	10	\$35,000	\$350,000	\$241,400	Yes
	4.9 m (16 feet)	10	\$35,000	\$350,000	\$283,900	Yes
NB-16	4.9 m (16 feet)	22	\$35,000	\$770,000	\$559,450	Yes
NB-17	3.0 m (10 feet)	16	\$33,000	\$528,000	\$269,700	Yes
	3.7 m (12 feet)	30	\$35,000	\$1,050,000	\$333,500	Yes
	4.3 m (14 feet)	30	\$35,000	\$1,050,000	\$411,800	Yes
	4.9 m (16 feet)	30	\$35,000	\$1,050,000	\$484,300	Yes
NB-18	3.7 m (12 feet)	36	\$27,000	\$972,000	\$431,250	Yes
	4.3 m (14 feet)	36	\$29,000	\$1,044,000	\$532,500	Yes
	4.9 m (16 feet)	54	\$29,000	\$1,566,000	\$626,250	Yes
NB-19	3.0 m (10 feet)	16	\$31,000	\$496,000	\$102,300	Yes
	3.7 m (12 feet)	16	\$31,000	\$496,000	\$126,500	Yes
	4.3 m (14 feet)	16	\$31,000	\$496,000	\$156,200	Yes
	4.9 m (16 feet)	16	\$31,000	\$496,000	\$183,700	Yes
NB-20	3.0 m (10 feet)	6	\$33,000	\$198,000	\$83,700	Yes
	3.7 m (12 feet)	6	\$33,000	\$198,000	\$103,500	Yes
	4.3 m (14 feet)	6	\$33,000	\$198,000	\$127,800	Yes
	4.9 m (16 feet)	6	\$33,000	\$198,000	\$150,300	Yes
NB-21	3.0 m (10 feet)	57	\$29,000	\$1,653,000	\$399,900	Yes
	3.7 m (12 feet)	57	\$29,000	\$1,653,000	\$494,500	Yes
	4.3 m (14 feet)	57	\$29,000	\$1,653,000	\$610,600	Yes
	4.9 m (16 feet)	57	\$29,000	\$1,653,000	\$718,100	Yes
NB-22	4.9 m (16 feet)	9	\$29,000	\$261,000	\$167,000	Yes
NB-23	4.9 m (16 feet)	71	\$35,000	\$2,485,000	\$1,285,900	Yes
NB-24	3.0 m (10 feet)	35	\$41,000	\$1,435,000	\$325,500	Yes
	3.7 m (12 feet)	35	\$41,000	\$1,435,000	\$402,500	Yes
	4.3 m (14 feet)	35	\$43,000	\$1,505,000	\$497,000	Yes
	4.9 m (16 feet)	35	\$43,000	\$1,505,000	\$584,500	Yes
NB-25	3.0 m (10 feet)	32	\$39,000	\$1,248,000	\$585,900	Yes
	3.7 m (12 feet)	32	\$39,000	\$1,248,000	\$724,500	Yes
	4.3 m (14 feet)	32	\$39,000	\$1,248,000	\$894,600	Yes
	4.9 m (16 feet)	32	\$39,000	\$1,248,000	\$1,052,100	Yes
NB-26	4.3 m (14 feet)	5	\$31,000	\$155,000	\$184,600	No
	4.9 m (16 feet)	5	\$33,000	\$165,000	\$217,100	No

Table B
SUMMARY OF NOISE BARRIER REASONABLENESS
REDUCED BUILD ALTERNATIVE
(for feasible noise barriers only)

Proposed Noise Barrier	Height in meters (m) (feet)	Number of Benefited Residences	Reasonable Allowance per Benefited Residences	Total Reasonable Allowance per Noise Barrier	Engineer's Noise Barrier Cost Estimate	Reasonable
NB-1	4.9 m (16 feet)	30	\$27,000	\$810,000	\$551,100	Yes
NB-2	4.3 m (14 feet)	22	\$37,000	\$814,000	\$482,800	Yes
	4.9 m (16 feet)	42	\$39,000	\$1,638,000	\$567,800	Yes
NB-3	4.9 m (16 feet)	65	\$33,000	\$2,145,000	\$567,800	Yes
NB-4	3.0 m (10 feet)	105	\$33,000	\$3,465,000	\$574,275	Yes
	3.7 m (12 feet)	146	\$33,000	\$4,818,000	\$710,125	Yes
	4.3 m (14 feet)	146	\$33,000	\$4,818,000	\$876,850	Yes
	4.9 m (16 feet)	146	\$35,000	\$5,110,000	\$1,031,225	Yes
NB-5	4.3 m (14 feet)	88	\$31,000	\$2,728,000	\$603,500	Yes
	4.9 m (16 feet)	88	\$31,000	\$2,728,000	\$709,750	Yes
NB-6	4.3 m (14 feet)	51	\$31,000	\$1,581,000	\$518,300	Yes
	4.9 m (16 feet)	51	\$31,000	\$1,581,000	\$609,550	Yes
NB-7	4.9 m (16 feet)	123	\$35,000	\$4,305,000	\$709,750	Yes
NB-8	3.0 m (10 feet)	73	\$29,000	\$2,117,000	\$502,200	Yes
	3.7 m (12 feet)	73	\$31,000	\$2,263,000	\$621,000	Yes
	4.3 m (14 feet)	73	\$31,000	\$2,263,000	\$766,800	Yes
	4.9 m (16 feet)	73	\$31,000	\$2,263,000	\$901,800	Yes
NB-9	4.9 m (16 feet)	127	\$33,000	\$4,191,000	\$1,319,300	Yes
NB-10	3.0 m (10 feet)	38	\$33,000	\$1,254,000	\$441,750	Yes
	3.7 m (12 feet)	38	\$33,000	\$1,254,000	\$546,250	Yes
	4.3 m (14 feet)	38	\$33,000	\$1,254,000	\$674,500	Yes
	4.9 m (16 feet)	38	\$35,000	\$1,330,000	\$793,250	Yes
NB-11	4.9 m (16 feet)	62	\$37,000	\$2,294,000	\$1,369,400	Yes
NB-12	3.7 m (12 feet)	89	\$33,000	\$2,937,000	\$908,500	Yes
	4.3 m (14 feet)	89	\$33,000	\$2,937,000	\$1,121,800	Yes
	4.9 m (16 feet)	89	\$33,000	\$2,937,000	\$1,319,300	Yes
NB-13	4.9 m (16 feet)	21	\$31,000	\$651,000	\$542,750	Yes
NB-13A	3.0 m (10 feet)	9	\$31,000	\$279,000	\$172,050	Yes
	3.7 m (12 feet)	9	\$31,000	\$279,000	\$212,750	Yes
	4.3 m (14 feet)	9	\$31,000	\$279,000	\$262,700	Yes
	4.9 m (16 feet)	16	\$31,000	\$496,000	\$308,950	Yes
NB-14	3.0 m (10 feet)	19	\$31,000	\$589,000	\$158,100	Yes
	3.7 m (12 feet)	19	\$31,000	\$589,000	\$195,500	Yes
	4.3 m (14 feet)	19	\$31,000	\$589,000	\$241,400	Yes
	4.9 m (16 feet)	19	\$31,000	\$589,000	\$283,900	Yes
NB-15	3.7 m (12 feet)	10	\$33,000	\$330,000	\$195,500	Yes
	4.3 m (14 feet)	10	\$35,000	\$350,000	\$241,400	Yes
	4.9 m (16 feet)	10	\$35,000	\$350,000	\$283,900	Yes

Table B
SUMMARY OF NOISE BARRIER REASONABLENESS
REDUCED BUILD ALTERNATIVE
(for feasible noise barriers only)

Proposed Noise Barrier	Height in meters (m) (feet)	Number of Benefited Residences	Reasonable Allowance per Benefited Residences	Total Reasonable Allowance per Noise Barrier	Engineer's Noise Barrier Cost Estimate	Reasonable
NB-16	4.9 m (16 feet)	22	\$35,000	\$770,000	\$559,450	Yes
NB-18	4.9 m (16 feet)	61	\$37,000	\$2,257,000	\$626,250	Yes
NB-19	3.0 m (10 feet)	16	\$31,000	\$496,000	\$102,300	Yes
	3.7 m (12 feet)	16	\$31,000	\$496,000	\$126,500	Yes
	4.3 m (14 feet)	16	\$31,000	\$496,000	\$156,200	Yes
	4.9 m (16 feet)	16	\$31,000	\$496,000	\$183,700	Yes
NB-20	3.0 m (10 feet)	6	\$33,000	\$198,000	\$83,700	Yes
	3.7 m (12 feet)	6	\$33,000	\$198,000	\$103,500	Yes
	4.3 m (14 feet)	6	\$33,000	\$198,000	\$127,800	Yes
	4.9 m (16 feet)	6	\$33,000	\$198,000	\$150,300	Yes
NB-21	3.0 m (10 feet)	57	\$29,000	\$1,653,000	\$399,900	Yes
	3.7 m (12 feet)	57	\$29,000	\$1,653,000	\$494,500	Yes
	4.3 m (14 feet)	57	\$29,000	\$1,653,000	\$610,600	Yes
	4.9 m (16 feet)	57	\$29,000	\$1,653,000	\$718,100	Yes

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